WATER QUALITY

Previous chapters have described the waters off the Pacific coast as being among the richest in biological diversity in United States coastal waters. Water quality plays a critical role in maintaining California's ocean ecosystem, which consists of the inland watershed, enclosed waters, nearshore ocean, and offshore ocean zones. The State of California has established ocean and coastal water quality standards pursuant to State law and responsibilities delegated by the U.S. Environmental Protection Agency. Several new efforts are underway to provide further protection of ocean and coastal water quality as a result of recently enacted legislation and developing partnership approaches. This chapter examines how California's water quality standards are established, administered, and enforced; reviews many laws, processes, and procedures that affect water quality protection and management; and specifically addresses point and non-point sources of pollution, dredging, beach contamination, garbage disposal, water quality monitoring, and educational needs.

BACKGROUND

Long-term maintenance and enhancement of the State's ocean and coastal waters can only be achieved with coordinated efforts to manage California's entire ocean ecosystem. Chapter 4 describes the geographic zones that make up this ecosystem: the inland watershed zone, the enclosed waters zone, the nearshore ocean zone, and the offshore ocean zone (see Figure 4-1). There is growing recognition that the majority of impacts to California's enclosed waters and nearshore ocean zones derive from pollution transported through inland waterways leading to the ocean. However, ocean water quality can be affected by activities within any of the zones. For instance, accidental releases of untreated sewage and oil spills on land or in the open ocean can adversely affect enclosed waters, such as bays, estuaries, coastal wetlands and lagoons, and inland waterways used by anadromous fish species.

Water quality in California has been improved by State and federal water quality protection programs that require coordinated approaches to water quality management. Water quality is affected by two types of pollution, the difference between the two being determined by the source of input into the marine environment. *Point source pollution* is characterized by its entry to the aquatic environment from a specific structural facility, such as a pipeline outfall system, and can be generated from a variety of industrial and municipal facilities, including sewage treatment plants, oil refineries, or power plants. *Nonpoint source pollution, or polluted runoff,* is any source that is not a point source and includes runoff from a variety of land uses such as agricultural, urban, forestry, or mineral operations. Ocean dredge disposal, beach contamination, and garbage disposal are discussed separately in the following analysis.

ISSUE ANALYSIS

Point Source Pollution

Treatment facilities for point source pollution are categorized as primary (physical treatment), advanced primary (physical and some chemical treatment), secondary (physical and biological treatment), and tertiary (additional control measures beyond secondary treatment to remedy specific pollution problems). Over the past 20 years, emphasis on point source pollution control has produced significant improvements in water quality. Dischargers are required to obtain permits specifying requirements to be met, including conditions for discharge, effluent standards, discharge improvement schedules, and self-monitoring activities.

Federal Requirements. In 1972, the Congress enacted the federal Water Pollution Control Act (now known as the Clean Water Act; 33 U.S.C.A. Section 1252 et seq.) which established the National

Pollutant Discharge Elimination System (NPDES), a permitting process to regulate point source discharges of pollutants to navigable waters of the United States. The U.S. Environmental Protection Agency (USEPA) issues NPDES permits in federal waters and has delegated authority to the State Water Resources Control Board (SWRCB) to issue these permits in State waters. Permits are issued for discharges from sources such as offshore oil and gas platforms, publicly owned treatment works, refineries, and storm water discharges. For example, the USEPA issues permits for all oil and gas platforms located in the federal Outer Continental Shelf. Specifically, 14 of the 23 oil and gas platforms located in federal waters offshore California are covered by a general NPDES permit issued by the USEPA in February 1982 (no five-year review has occurred); the other 9 platforms are covered by individual NPDES permits. All NPDES permits for discharges in the federal Outer Continental Shelf also require a determination by the California Coastal Commission that the activity is consistent with California's Coastal Management Program.

Pursuant to the Clean Water Act (CWA), municipalities are required to provide secondary treatment of discharges. Assistance is provided through a multi-billion dollar State Revolving Loan Program for communities to build municipal wastewater treatment facilities, as well as to address other point source discharges. However, Section 301(h) of the CWA provides for a waiver of the full secondary sewage treatment requirement if certain conditions are met demonstrating equivalent treatment. To receive a Section 301(h) waiver, the USEPA requires a permittee to demonstrate, through stringent monitoring and toxic source control, that no harm results to indigenous organisms near the effluent plume due to the discharge. The USEPA issued waivers to four sanitation districts in California within the initial time limitations set forth in the CWA: Orange County, Goleta, Morro Bay, and Watsonville. Although the Watsonville sanitation district currently has a waiver, it is in the process of converting to secondary treatment. The City of San Diego did not meet the waiver deadline and was in litigation with the USEPA over their approach to water quality protection. The litigation was settled after the City of San Diego agreed to conditions for meeting the Section 301(h) requirements. Special legislation extended the waiver deadline and a waiver was granted to San Diego in the fall of 1995.

State Requirements. The SWRCB has the primary responsibility to protect California's coastal and ocean water quality pursuant to the Porter-Cologne Water Quality Control Act. This act is one of the nation's strongest anti-pollution laws and has provisions for enforcing water quality standards through issuance of Waste Discharge Requirements. As stated previously, the SWRCB has been delegated authority by the USEPA to administer the NPDES program for discharges in State Tidelands. The Regional Water Quality Control Boards (RWQCBs) issue both State waste discharge requirements and NPDES permits to individual dischargers, subject to the approval of the SWRCB and USEPA. Dischargers are required to establish self-monitoring programs for their discharges and submit compliance reports to the RWQCBs. Most NPDES permits and waste discharge requirements are combined into one permit.

The SWRCB has established regulations to implement these measures through water quality control plans which include the California Ocean Plan (Ocean Plan), Regional Water Quality Control Plans (Basin Plans), and the Thermal Water Quality Control Plan (Thermal Plan). Both Ocean and Basin plans identify beneficial uses within the area being addressed and lay out numerical and narrative objectives for waste discharges, as well as implementation procedures for achieving these objectives.

The Ocean Plan applies to ocean waters, defined as the:

> "...territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters." (SWRCB 1990).

For example, although the cities of San Diego and San Francisco have discharges in federal waters, their discharge permits are subject to California Ocean Plan requirements. Basin Plans direct the water quality programs of the nine RWQCBs, while the Thermal Plan sets standards for the temperature of discharges

into waters of the State.

Urban Storm Water Permitting Program. Urban storm water consists of runoff from such sources as gas stations, parking lots, highways, golf courses, industrial operations, and residential lawns which enter storm drains and ultimately coastal waters. Both the SWRCB and RWQCBs staff have determined that stormwater runoff is a major problem in large urban centers, like the Santa Monica and San Francisco Bay Areas, and, during passage of the 1987 amendments to the CWA, the Congress expressed particular concern about the impacts of urban storm water runoff from industrial and municipal sources. In May 1996, the Santa Monica Bay Restoration Project released the report titled, *An Epidemiological Study of Possible Adverse Affects of Swimming within Santa Monica Bay.* The study combined water quality testing results near storm water outfalls with follow-up interviews of individuals swimming in these waters. The study found that some of these individuals became ill with symptoms such as fever, chills, gastroenteritis, and respiratory problems. As a result, upgrades were made to warning signs indicating that swimming in these areas may spread infectious disease. The findings also underscore the need to reduce pollution sources which degrade water quality near these outfalls.

Section 402(p) of the CWA now requires urban storm water outfall systems to be considered point sources and established a permit system that became effective in October 1992. The classification of urban stormwater as a point source can be somewhat confusing. Typical examples of point sources are discharges from discrete waste water treatment facilities. Storm water drainage usually emanates from many widely-dispersed sources and is often mistakenly thought of as a nonpoint source discharge. The 1987 CWA amendments require cities of 100,000 or greater, municipalities, and industries to apply for an NPDES permit to discharge storm water into storm drains. The SWRCB has adopted two general NPDES permits addressing industrial and construction activities, yet establishing standards and means of enforcement for this pollution source present significant challenges. Efforts to address these impacts include the San Francisco Bay, Morro Bay, and Santa Monica Bay Estuary restoration projects and ongoing efforts by State agencies such as the SWRCB and California Coastal Commission.

Nonpoint Source Pollution

Although nonpoint source pollution, or polluted runoff, has historically received less emphasis than point source pollution, government programs are gaining momentum to address this substantial source of water pollution. Staff at the SWRCB indicate that nonpoint source pollution is the major remaining cause of impairment to the State's waters. The SWRCB's 1988 Nonpoint Source Management Plan states, "nonpoint [pollution] sources are the major contributor of pollution to impacted streams,...marine waters,...wetlands and estuaries, and are an important contributor of pollution to harbors and bays." In the past few years, public awareness and government management efforts have turned to several complex and pressing issues regarding polluted runoff, including the impacts of petrochemical and metals runoff from urban areas; nutrients, pesticides, and sediment runoff from agricultural and forestry operations; heavy metals leaching from inactive mines; erosion from modification of stream channels; and runoff from marinas and recreational boating activities. The relative importance of these pollution sources differs for each watershed of the State, reflecting the dominant land uses in each.

Federal Requirements. There have been three major developments in nonpoint source pollution response at the federal level:

1. *Water Pollution Control Act of 1972 (also called the Clean Water Act).* Section 208 of the CWA focused on issue identification, initial planning measures, and voluntary programs that should be considered with regard to nonpoint pollution.

2. *Clean Water Act Amendments of 1987 (also called the Water Quality Act of 1987).* Section 319 was added to the CWA, providing a more aggressive approach to controlling or minimizing

nonpoint source pollution by committing federal funds for state management plans, demonstration projects, and implementation plans.

3. *Coastal Zone Act Reauthorization Amendments of 1990 (CZARA).* Section 6217 of the CZARA requires states with approved coastal management programs to develop Coastal Nonpoint Pollution Control Programs. The USEPA and the National Oceanic and Atmospheric Administration (NOAA) jointly administer this program at the federal level, while the Coastal Commission, SWRCB and six coastal RWQCBs are required to develop and administer it at the State level. Although the requirements for this program remain in place, the 104th Congress did not appropriate any funding for implementation.

State Requirements. The programs and policies of the SWRCB for preventing polluted runoff are included in its Nonpoint Source Management Plan (NSMP) prepared pursuant to Section 319 of the CWA. In response to Section 6217 of CZARA, the SWRCB and Coastal Commission reviewed the NSMP to determine whether the existing programs of the SWRCB and other State and federal programs are adequate to comply with the new requirements. Section 6217 requires the State to implement 56 enforceable management measures that have been identified by the USEPA to address polluted runoff from all sources: agriculture, forestry, urban areas, hydromodification, and abandoned mines. Although the emphasis of the program is voluntary, the statute also provides enforcement mechanisms for these provisions.

Technical advisory committees (TACs), composed of representatives from industry, academia, environmental groups, and state and federal agencies provided critical input to the program review. For one year the TACs reviewed current nonpoint source programs and developed consensus-based recommendations for improving implementation, including innovative approaches for using existing programs more efficiently, allowing limited staff and fiscal resources to be focused on the most pressing water quality problems. The technical advisory committee (TAC) reports contained several common themes: (1) voluntary cooperation is preferred over prescriptive measures, particularly for agricultural activities; (2) there is a need for better public education so that individuals can take responsibility and make the cooperative approach work; (3) there are benefits to managing nonpoint source pollution on a watershed scale where local stewardship and specific, problem-responsive measures can be devised through a comprehensive watershed management plan; (4) there is a need for more comprehensive and directed technical assistance to local groups and individuals for managing nonpoint source pollution; and (5) activities of the various resource management agencies need to be better coordinated.

The Urban Runoff and Hydromodification TACs recommended that the California Environmental Quality Act (CEQA) Guidelines be revised to ensure that polluted runoff/watershed issues are addressed in the initial planning stages of any project. Specifically, the TACs recommended that measures minimizing runoff, protecting watershed habitat, and reducing flood risk be incorporated into project design. This would result in proposed developments addressing water quality and watershed concerns early in the process, potentially reducing environmental impacts and avoiding costly delays as the project proceeds through the permit process. These ideas were endorsed by the SWRCB in its report *Initiatives in Nonpoint Source Management*, which was adopted as part of the review process. Initial efforts to respond to these recommendations are embodied in a pilot effort to develop a small city water runoff management program in the Monterey Bay Area.

The SWRCB and Coastal Commission submitted the proposed Coastal Nonpoint Pollution Control Program (CNPCP) to the USEPA and NOAA in September 1995. The submittal provided a comprehensive description of the State's programs to satisfy the requirements of CZARA and the SWRCB's report *Initiatives in Nonpoint Source Management.* The CNPCP was not intended to be a new program, but rather a composite of existing activities which the SWRCB and Coastal Commission expect to provide effective management of nonpoint sources of water pollution throughout the State. Key to the review of California's CNPCP will be the need to determine if the overall approach and specific provisions meet the management measures set forth in Section 6217 of the CZARA.

Previous reviews conducted by the USEPA and NOAA regarding other state CNPCPs resulted in conditions calling for additions to the plans to ensure compliance with Section 6217. Aspects to be reviewed include the specificity of California's proposed watershed approach and how it will be enforced if voluntary measures prove ineffective; the relationship of the CNPCP to the NSMP and whether the two programs will be merged into a single process; and the degree to which the SWRCB and Coastal Commission have been responsive to the recommendations made by stakeholders in the TAC process. It will be important for the review process results to be incorporated, where applicable, into the SWRCB regulations within the Ocean and Basin plans.

Various federal, State, and local agencies, private non-profit groups, and land owners are also involved in other efforts to reduce nonpoint source pollution. For instance, many efforts are underway along the north coast to reduce the impacts of forestry operations, with an inventory of these efforts prepared by the Resources Agency's Coastal Salmon Natural Community Initiative available on the Internet through the California Environmental Resources Evaluation System (CERES). Projects are also being undertaken in San Francisco, Morro, and Santa Monica Bays through efforts coordinated by the respective RWQCBs and the National Estuary Program; in the watersheds draining into the Monterey Bay National Marine Sanctuary through efforts coordinated by the NOAA; and in other areas coordinated through local organizations, such as resource conservation districts. These efforts range from complex stream and river restoration projects to curb-marking programs which inform the public that storm drains lead to the sea. Information on over 300 watershed projects statewide is available on the Internet through the California Watershed Projects Inventory, a project housed at UC Davis and principally sponsored by the SWRCB, DFG, USEPA and UC Davis.

Other education and outreach efforts include the Coastal Commission's Coastal Cleanup Day and Adopt-A-Beach Program. In addition to its responsibilities under Section 6217, the Coastal Commission is addressing polluted runoff generated by land use activities in coastal watersheds through a number of related projects, such as the *Procedural Guidance Manual: Addressing Polluted Runoff in the California Coastal Zone.* This manual is a working reference guide for local governments, the Coastal Commission, and other public agencies to use in analyzing development that may contribute to polluted runoff.

The SWRCB has a number of outreach efforts underway, such as a series of workshops in 1996-97 to provide RWQCB staff and their local watershed partners training in watershed stewardship. SWRCB-administered grants and technical assistance support programs active throughout the coastal areas, including the Adopt-A-Watershed K-12 school program, citizen volunteer watershed monitoring, facilitation of watershed management groups, and implementation of comprehensive resource management plans. The challenge for the State is determining where current water quality programs exist and finding effective methods to help coordinate, implement, and expand them where necessary.

Disposal of Dredge Materials

Authorization to dispose of dredged materials in the ocean, within enclosed coastal waters, or on land is provided through a variety of federal and State permit processes. Under authority of the Rivers and Harbors Act (33 U.S.C.A. Section 401 et seq.), Section 404 of the CWA, and the Marine Protection, Research, and Sanctuaries Act (MPRSA or Ocean Dumping Act; 16 U.S.C.A. Sections 1431 and 1447 et seq., and 33 U.S.C.A. Sections 1401 and 2801 et seq.), the U.S. Army Corps of Engineers (Corps) develops, controls, maintains, and conserves the nation's navigable waters and wetlands. The Corps regulates development of any project involving fill, construction, or modification of waters of the United States. For example, pursuant to Section 103 of the MPRSA the Corps is authorized to permit disposal of dredged material into the ocean, if the Corps determines that "the dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environments, ecological systems, or economic potentialities." However, the Corps is prohibited from issuing such a permit if the USEPA finds that the proposal cannot meet its criteria established for disposal site selection pursuant to Section 102 of the MPRSA. Federal permits for dredge disposal cannot be issued, pursuant to Section 401 of the CWA, unless the SWRCB issues or waives a certification that the proposed activity will not violate State

water quality standards. In addition, the SWRCB regulates discharges of dredge materials into State waters by issuing Waste Discharge Requirements through its Porter-Cologne Water Quality Control Act authority. Finally, the Coastal Commission and the San Francisco Bay Conservation and Development Commission have authority over disposal of dredge materials pursuant to the federal consistency provisions of the CZMA.

The majority of dredging and filling operations along the coast occur within California's port facilities. One of the more innovative approaches to disposal of dredge materials has been the implementation of the Long Term Management Strategy for San Francisco Bay, a process which brings together interested parties to design long-term solutions to difficult questions. This process has resulted in solutions which address a mix of disposal options ranging from the use of dredge materials for wetland restoration projects to disposal in deep ocean basins located far off the California coastline. The chapter titled, *Shoreline Erosion* describes a process in San Diego where seven million cubic yards of sand from a Navy dredging project may be used to fortify beaches along the San Diego coastline, the result of key stakeholders coming together to develop a solution.

Similar issues exist with small harbors along the coast. Historically, dredge material has been a valuable source of material for beach nourishment. Many small ports and harbors regularly deposit dredge spoils downcoast for this purpose, providing benefits to tourism, recreation, and the safety of downcoast properties. However, this opportunity is sometimes missed because processes are often not in place to quickly authorize the use of "opportunistic sand" from construction projects or other sources. Increasingly, small ports have also had to deal with difficult dredging issues such as the accumulation of toxic sediments that need to be dredged and safely disposed of to maintain harbor entrances. More thorough discussions of dredge and fill operations are included in the chapters titled, *Ocean Jurisdiction and Management* and *Ports and Harbors.*

Beach Contamination

The Director of Environmental Health for each coastal county in California is required to report annually to the SWRCB on the number of beach closures and warning sign postings due to public health threats within their jurisdiction. The SWRCB has prepared annual reports to the Legislature describing the number of beach closures in 1993 and 1994. The reports indicate that the vast majority of closures were due to the release of inadequately treated sewage from such things as broken or damaged lines, heavy influxes of rainwater, grease blocking lines, power outages, and pump failures. While the amount of data available is inadequate to assess trends, the total number of beaches closed declined from 92 in 1993 (for a total of 1831 days) to 85 in 1994 (for a total of 1605 days). All counties reporting beaches closed in 1994 had less than ten except for Orange and San Diego counties; Orange County had 17 closures and San Diego County had 51 closures. San Diego has three permanent beach closures resulting from chronically elevated levels of coliform bacteria from contaminated water flowing north across the International Border. The total number of beach closure days for 1993 is reduced to 736 and 1994 is reduced to 510 if the three permanent closures are not included. No beach closures were reported north of San Francisco Bay. (SWRCB 1994 and SWRCB 1995).

The Natural Resources Defense Council (NRDC) annually publishes a report which documents beach closings throughout the nation's coastline through county questionnaires. The last two publications were *Testing the Waters IV: The Unsolved Problem of U.S. Beach Pollution* and *Testing the Waters V: Politics and Pollution at U.S. Beaches.* Of 31 states and territories surveyed during 1993, California had the highest number of reported beach closure days due to poor water quality (1,401 reported closure days out of a total 2,452 closings). Over 60% of these closings were located between San Diego and Los Angeles and almost 30% were in the San Francisco Bay Area. However, the report notes that the large number of beach closings and advisories in 1993 were due to the extraordinary amount of rainfall that occurred that year from winter storms. During 1994, U.S. ocean, bay, and Great Lakes beaches were closed, or advisories were issued against swimming, on more than 2,279 occasions and California had a total number of closure days of 910 for the year. The NRDC reports that the most frequent sources of

beach contamination in nearshore waters statewide are bacteria or viruses from a variety of sources, including urban runoff, municipal sewer discharges, and agricultural runoff. Beach contamination has also been associated with industrial waste discharges of toxic substances. (NRDC 1994 and NRDC 1995).

Garbage Disposal

Ocean disposal of garbage and other marine debris is distinguished from the discharge of wastes from a pipe or shore. Ocean disposal is defined by the London Dumping Convention (1975) as the "deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms, or manmade structures." According to the Marine Board of the National Research Council, the amount and precise characteristics of garbage thrown overboard from vessels is unknown. Vessel discards into the marine environment are difficult to identify due to domestic and industrial sewer discharges, and the littering of coastal waters by land-generated wastes left on beaches or transported to the ocean via offshore winds, rivers, and coastal runoff. In evaluating this problem, the Marine Board made four findings:

> "First, considerable amounts of garbage are generated by seafarers in most if not all maritime communities. Second, garbage discarded into the sea can be transported far from the point of discharge. Third, the disposal of plastics in the marine environment is causing considerable harm, including mortality among marine mammals, turtles, birds, and fish, either through entanglement or ingestion. The fourth finding, which is multifaceted, is that available data on the sources, fates, and effects of marine debris - particularly vessel-generated debris - are often of poor quality, incomplete, and out of date." (National Research Council 1995).

Reducing marine debris resulting from garbage disposal is one of the objectives of the 1978 International Marine Pollution Convention (MARPOL Treaty) and the federal Marine Plastics Pollution Research and Control Act, which specifically targets plastic debris. Plastic debris is especially troublesome as marine species can become entangled in plastic products and frequently mistake the products for food. The *California Marine Debris Action Plan* cites 55% of the trash on California's beaches as plastic (Center for Marine Conservation 1990). This action plan made 22 recommendations for addressing enforcement of existing laws, educating the public, conducting more research, and enacting new legislation.

Pollution from watercraft involves the disposal of garbage, sludge, and vessel sewage. The U.S. Coast Guard is the federal agency charged with enforcing regulations for trash disposal at sea and requirements for sewage-holding tanks aboard vessels. Unfortunately, enforcing these regulations is logistically difficult. The RWQCBs have regulatory authority in marinas, but limited resources are available for enforcement.

An innovative approach to reducing pollution from watercraft in port or at sea is the Marine Debris Recycling and Education Program (MDREP) founded by the non-profit Coastal Resources Center. This program provides educational and technical assistance to facilities (marinas, ports, and harbors) and the public to help minimize the disposal of solid waste and oil into the marine environment. The first program to pioneer solid waste recycling at public marinas, the MDREP has produced a guidebook titled, *Launching a Recycling Program at Your Marina.* Program participants include the Marin County marinas, Pillar Point Harbor in Half Moon Bay, and San Francisco's Fisherman's Wharf and Pier 47. The MDREP receives its support from the California Department of Conservation's Division of Recycling and the Marin Community Foundation. In addition, the Water Quality Protection Program for the Monterey Bay National Marine Sanctuary (MBNMS) is addressing the issue of marine debris in *Action Plan 3: Marinas and Boating.* This action plan relies substantially on the expertise and recommendations obtained during water quality workshops sponsored by the MBNMS, as well as from findings of the Boating and Marina TAC established pursuant to Section 6217 of CZARA.

Other efforts to address ocean pollution strive to increase public awareness through education, recycling, and coastal cleanups. For instance, the Coastal Commission's Adopt-a-Beach program organizes thousands of volunteers, hundreds of public and private sponsors, as well as city, county, state, and federal agencies to participate in beach cleanup and ocean resource education. Under this program beaches are adopted by school groups, civic organizations, corporations, and recreation groups who commit to keeping these areas clean year round. The State Legislature supports this program and annually designates a statewide beach cleanup day and a CoastWeeks education and awareness program. While the Department of Conservation and Coastal Commission have provided a portion of the program's financial support over the years, corporate sponsors have increasingly become the main funding source.

Ocean litter and debris is part of the much larger solid waste disposal problem in California. The Integrated Waste Management Board administers the California Integrated Waste Management Act of 1989 (PRC Section 40000 et seq.) which requires all California cities and counties to reduce their waste stream by 25% no later than 1995 and by 50% no later than the year 2000. In addition, the Department of Conservation's Division of Recycling administers the California Beverage Container Recycling and Litter Abatement Act of 1987 (PRC Section 14500 et seq.), which places a California Redemption Value on selected beverage containers. Data from the annual Adopt-a-Beach Coastal Cleanup indicates that beverage containers dropped from 13.1% of beach trash in 1988 to 3.9% in 1991 (Liebster, pers. comm.).

Water Quality Monitoring

Water quality monitoring is conducted in various locations along the California coast pursuant to permit requirements, voluntary programs, or efforts by government, the private sector, academic research institutions, industries, and various non-profit groups. Although multiple sources of water quality monitoring information exist, many portions of the coastline do not have regular sources and no comprehensive inventory currently exists to determine the full extent of these monitoring activities.

Regional monitoring has been proposed as a means to assess water and sediment quality in the ocean. Regional boundaries would be based on specific physical and ecological sections of California’s coastal waters, as opposed to onshore hydrologic watersheds or land-based political jurisdictions. For each identified coastal region, results from the regional monitoring program would be used by the appropriate RWQCBs to identify pollution sources and reduce pollutant discharge.

A working example of this approach is the Southern California Bight Pilot Project, a regional monitoring program stretching from Point Conception to the Mexican border being used to determine the ecological health of the region’s waters. The pilot project has involved cooperation by the four major ocean wastewater dischargers in the region, three coastal RWQCBs, the USEPA, and an independent research facility, the Southern California Coastal Water Research Project. While still in the pilot project phase, initial results have been sufficiently promising that regional monitoring has been proposed for other coastal regions. For example, the San Francisco Estuary Regional Monitoring Program has been established under the auspices of the San Francisco Bay RWQCB and is operated by the San Francisco Estuary Institute.

The California Department of Health Services (DHS) and many, but not all, of California’s coastal counties conduct water quality testing and monitoring of coastal waters. Subsequent decisions to close beaches are based on non-compliance with DHS regulations. County health departments are required to report beach closures to the SWRCB where the data is entered into a centralized data collection system, and an annual beach closure report is prepared for the Legislature. Unfortunately, the State does not have a water quality monitoring program which covers all tributaries, small bays and estuaries, or the entire nearshore waters along the California coast. Therefore, it is difficult to comprehensively determine the health of these water bodies. As a principal beneficiary of clean marine waters, the aquaculture industry has been active in pursuing legislation to better address coastal point and nonpoint source pollution.

Because California's oyster growers must meet stringent health standards, this industry supported the passage of the Shellfish Protection Act of 1993 (Chap. 1081, Stats.1993), requiring the RWQCBs to investigate the causes of pollution that have adversely affected shellfish growing areas.

State Supported Water Quality Monitoring Programs. For the past 19 years, the State of California has monitored water quality at selected locations along the coast and within inland waterways which drain to the sea, through the State Mussel Watch and Toxic Substances Monitoring (TSM) programs. Traditionally funded by the SWRCB with water bond funds, these programs have most recently been funded with NPDES permit fees. An additional effort, the Bay Protection and Toxic Cleanup (BPTC) Program was established by the Legislature in 1989 as a fee-supported program. The Department of Fish and Game (DFG) provides staff and technical support for all three programs.

The State Mussel Watch and BPTC are the only long-term statewide water quality monitoring programs for bays, estuaries, and open water locations in California. Mussels and clams are moved from relatively clean coastal sites to areas of concern and later removed for laboratory analysis for various toxic substances which may have accumulated in their bodies. The TSM is a related program for inland waters which uses a variety of species to test for toxic substances in the water.

The National Mussel Watch Program began in 1975 with a few monitoring stations along the California coast. In 1977, the State Water Resources Control Board obtained funding for both Mussel Watch and TSM to add substantially more stations. These programs peaked in 1990-91 with approximately 2746 analyses at 254 stations. Progressive funding limitations have reduced the programs by almost 50 percent to 1422 analyses at 132 stations during fiscal year 1995-96. The DFG has maintained frozen samples from these stations (some are over 19 years old) which provide an important long-term physical record of water quality along these areas of the California coast.

The Mussel Watch and TSM programs have been useful in identifying “hot spots” where pollutants have accumulated, as well as long-term water quality trends where pollutants have either increased or decreased over the years. Data from these programs have been essential to supporting cleanup orders statewide, including lead contamination at the Selby slag pile in Contra Costa County, PCBs in the inner Los Angeles Harbor, PCBs in San Diego Bay, DDT in Richmond Harbor from the Lauritzen Canal, TBT in Moss Landing and Santa Cruz harbors, and copper from offloading facilities in Los Angeles and San Diego harbors. The programs also provide technical support for the Bay Protection and Toxic Cleanup Program, which evaluates water quality within San Francisco, San Diego and other bays. Monitoring data from these programs has been used by the SWRCB, RWQCBs, Coastal Commission, DFG, California Department of Pesticide Regulation, US Fish and Wildlife Service, NOAA, a variety of local governments, and other interests such as the Pacific Gas and Electric Company.

Monitoring programs are important not only for environmental and public health issues, but also because coastal-dependent industries such as tourism, aquaculture, and fisheries contribute billions of dollars to the State economy each year and depend on good water quality. Additionally, public comments received at all six public workshops held on the draft Agenda for the Future supported the maintenance and expansion of these water quality monitoring programs.

California Ocean Plan. As a result of its 1991-92 triennial review of the California Ocean Plan, which sets the State’s ocean water quality standards, the SWRCB is reviewing the plan’s bacterial standards and monitoring requirements. The SWRCB has contracted with the University of California at Berkeley to perform a "Marine Bacterial Indicator Monitoring Assessment” to examine bacterial monitoring performed by two ocean dischargers: the City of San Diego and the City/County of San Francisco. The study aims to identify the "best" indicator organism to use in coastal California monitoring programs (that is, the best to unequivocally indicate the presence of human fecal waste). It will describe the advantages and disadvantages of each of several bacterial groups, including total coliform, E. coli and enterococcus sp. As part of the bacterial standards review, a microbiological advisory committee of outside experts was formed to assist in the study design and to advise and make recommendations to the SWRCB on the

subject of bacterial indicators. Other issues under review include, water quality objectives for dioxins and other chemicals of concern, regional monitoring programs, acute and chronic toxicity testing, and special water quality protection for Monterey Bay and other National Marine Sanctuaries located in California's waters.

Educational Materials and Programs

The Agenda chapter titled, *Education, Research and Technology* provides additional information regarding educational materials and programs available in California. However, there are literally hundreds of information sources and programs and it is only possible in this document to provide a brief summary of the many available. Some examples for water quality information include educational materials distributed by the SWRCB and its RWQCBs, California Sea Grant College, USC Sea Grant Institutional Program, and California Coastal Commission through its Adopt-A-Beach Program. Many cities and counties also provide educational information regarding ocean and coastal water quality. As for direct public education programs, Heal the Bay launched a campaign in 1992 to raise public awareness that pollution entering catch basins and storm drains ends up in the Santa Monica Bay. That campaign includes gutter patrolling and storm drain stenciling. The Surfrider Foundation created the "Blue Water Task Force," which collects and compiles water quality samples in order to demonstrate the severity of coastal water pollution, raise public awareness, and provide data to develop solutions for combating nearshore pollution. Many other organizations such as the Center for Marine Conservation, the American Oceans Campaign, and Save Our Shores are conducting similar types of education programs along the California coast.

FINDINGS AND RECOMMENDATIONS

Finding

Nonpoint source pollution, or polluted runoff, is arguably the State's most significant source of water pollution, impairing estuaries, bays, and nearshore waters. An extensive system to regulate point source pollution has been in place for many years. However, reducing nonpoint source pollution in California requires the renewed commitment and cooperation of federal, State, and local agencies, local land-use interests, the private sector, and the broader public in the complicated task of managing entire watersheds. Implementing both Section 319 of the Clean Water Act and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) will require a long-term financial commitment from both the federal government and the State of California to resolve the State's water quality management needs. The 104th Congress did not provide funding for implementing the requirements of Section 6217 of the CZARA for fiscal year 1996-97. However, the Governor's 1997-98 Budget proposes a $3.8 million Watershed Initiative to assist the Department of Fish and Game, the State Water Resources Control Board, the Department of Conservation, and the Department of Forestry and Fire Protection in efforts to reduce water quality and habitat impacts in key watersheds throughout the State of California.

Recommendation B-1. ***Conduct a thorough inventory and assessment of all ongoing watershed management projects and activities that affect California's ocean ecosystem and use this information to determine priorities for future actions.*** Much of this information exists and some has been compiled for limited geographic regions, but it has not been compiled in one place for the entire State. The Resources Agency (in coordination with the California Watershed Projects Inventory and other entities) is providing an important start by inventorying existing restoration and monitoring activities, regulatory procedures, and planning processes along the North Coast. The Governor's

Watershed Initiative included in the 1997-98 Budget will help ensure that these ongoing efforts can be completed and new efforts initiated where necessary. This inventory approach should be expanded to include information about other watershed planning efforts in Central and Southern California including the Monterey Bay National Marine Sanctuary Water Quality Protection Program, Morro Bay National Estuary Program, and the Santa Monica Bay Restoration Project.

Recommendation B-2. ***Pursue new and innovative approaches to watershed management, such as watershed conservation banks, which maximize results and the efficiency of expenditures.*** Water quality goals may potentially be met more effectively through existing permit processes by allowing municipalities or other permit applicants to mitigate their project impacts at regional conservation banks. This approach could yield greater benefits for water quality at reduced costs by focusing efforts on locations within the region where the most effective improvements in water quality can be achieved.

Recommendation B-3. ***Pursue more technical and financial assistance from the federal government for supporting California's efforts to develop and implement nonpoint pollution strategies pursuant to Section 6217 of the CZARA and Section 319 of the Clean Water Act.*** Solutions to nonpoint source pollution require extensive coordination and cooperation among a wide variety of participants. Federal assistance should be budgeted to support existing State programs to address impaired and threatened water bodies and their adjacent watersheds.

Finding

Guidance provided by technical advisory committees established pursuant to Section 6217 of the CZARA, and endorsed by the State Water Resources Control Board in the report **Initiatives in Nonpoint Source Management*****, emphasize the importance of incorporating measures to minimize runoff, protect watershed habitat, and reduce flood risk in project designs.*** Measures to address these concerns early in the permit process will help to minimize project impacts and avoid costly delays.

Recommendation B-4. ***Pursue amendments to the California Environmental Quality Act (CEQA) Guidelines to address water quality issues more comprehensively in the planning stages of development projects.*** Specifically, the CEQA Guidelines should be amended to require the applicant's Environmental Information Form and the lead agency's Environmental Checklist Form to address the potential of non-point pollution; include approved watershed plans as guidance for projects of statewide, regional, or area-wide significance; and address the potential for increased off-site flood risks caused by the development.

Finding

The State of California does not have a system to comprehensively monitor water quality in the inland watershed, enclosed waters, or nearshore ocean zones. Sound water quality management decisions require a solid base of information collected from a variety of sources. Most of the existing monitoring programs are designed to measure the impacts of point source pollutant loads. However, with the exception of limited data provided from the State Mussel Watch, Toxic Substances Monitoring, and Bay Protection and Toxic Cleanup programs, the majority of California's waterways and small estuarine

systems are not monitored by the State on a regular basis. Other monitoring programs exist, yet no overall inventory of these efforts is currently available for the entire California coast. Improved monitoring, or in some cases improved coordination of existing efforts, will be necessary for the State of California to achieve a systematic understanding of nonpoint source pollution and to measure the effect of efforts to reduce this water pollution source.

Recommendation B-5. ***Inventory existing water quality monitoring efforts and use this information to develop a comprehensive water quality monitoring program for coastal streams, bays, estuaries, and nearshore ocean waters.*** For large bays and sections of nearshore coastal waters, regional monitoring programs should be initiated to determine baseline water and sediment quality conditions and to ascertain the relative health of ocean and coastal resources. Monitoring data from federal, State, and local governments, the private sector, citizen groups and non-profit organizations should be made accessible through the CERES at http://ceres.ca.gov. The water quality monitoring program should seek to include:

- mechanisms for providing technical and financial assistance to the State and local governments participating in regional monitoring efforts to monitor water quality within watersheds, enclosed waters, and nearshore ocean waters;

- potential expansion of citizen water quality monitoring efforts, if quality assurance and control issues for data collection can be developed and implemented; and

- a standard protocol for sampling and data collection methods to ensure that the information generated will be useful to water quality decision makers.